California High School Exit Examination

Mathematics
Released Test Questions

California Department of Education
October 2005

Introduction

Beginning with the 2005-06 school year, every student must pass the California High School Exit Examination (CAHSEE) to receive a high school diploma from a California public school. Students in the Class of 2006 had their first opportunity to take the CAHSEE in February and March 2004.

All questions on the CAHSEE are evaluated by committees of content experts, including California educators, teachers, and administrators, to ensure the questions' appropriateness for measuring the designated California academic content standards in English-language arts and mathematics. In addition to content, all items are reviewed and approved to ensure their adherence to the principles of fairness and to ensure no bias exists with respect to characteristics such as gender, ethnicity, and language.

This document combines released test questions that have appeared on CAHSEE test forms since the 2000-2001 school year, and contains new test questions from the 2004-2005 school year. The questions are grouped by strand (e.g., Number Sense). At the beginning of each strand section is a list of the specific standards assessed on the CAHSEE. Following a group of questions is a table that gives the correct answer for each question, the content standard each question is measuring, and the year each question originally appeared on the CAHSEE.

The following table lists each strand, the number of items that appear on the exam, and the number of released test questions that appear in this document.

STRAND	NUMBER OF QUESTIONS ON EXAM	NUMBER OF RELEASED TEST QUESTIONS
• Number Sense (NS)	14	29
• Statistics, Data Analysis, and Probability (PS)	12	23
• Algebra and Functions (AF)	17	30
• Measurement and Geometry (MG)	17	35
• Mathematical Reasoning (MR)	8	17
• Algebra I (1A)	12	30
TOTAL	**80**	**164**

In selecting test questions for release, three criteria are used: (1) the questions adequately cover the content standards assessed on the CAHSEE; (2) the questions demonstrate a range of difficulty; and (3) the questions present a variety of ways each standard can be assessed. These released test questions do not reflect all of the ways the standards may be assessed. Released test questions will not appear on future tests.

For more information about the CAHSEE, visit the CDE's Web site at http://www.cde.ca.gov/ta/tg/hs.

NUMBER SENSE

The following ten California mathematics academic content standards from the Number Sense strand are assessed on the CAHSEE by 14 test questions and are represented in this booklet by 29 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — NUMBER SENSE	
Standard Set 1.0	**Students know the properties of, and compute with, rational numbers expressed in a variety of forms:**
1.1	Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation.
1.2	Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.
1.3	Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.
1.6	Calculate the percentage of increases and decreases of a quantity.
1.7	Solve problems that involve discounts, markups, commissions, and profit, and compute simple and compound interest.
Standard Set 2.0	**Students use exponents, powers, and roots, and use exponents in working with fractions:**
2.1	Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.
2.2	Add and subtract fractions by using factoring to find common denominators.
2.3	Multiply, divide, and simplify rational numbers by using exponent rules.
2.4	Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine without a calculator the two integers between which its square root lies and explain why.
2.5	Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.

Number Sense

1. The radius of the earth's orbit is 150,000,000,000 meters. What is this number in scientific notation?

   A 1.5×10^{-11}

   B 1.5×10^{11}

   C 15×10^{10}

   D 150×10^{9}

M00213

2. $3.6 \times 10^2 =$

   A   3.600

   B   36

   C   360

   D   3,600

M00036

3. The five members of a band are getting new outfits. Shirts cost $12 each, pants cost $29 each, and boots cost $49 a pair. What is the <u>total</u> cost of the new outfits for <u>all</u> of the members?

   A $90

   B $95

   C $450

   D $500

M00331

4. $\dfrac{11}{12} - \left(\dfrac{1}{3} + \dfrac{1}{4}\right) =$

   A $\dfrac{1}{3}$

   B $\dfrac{3}{4}$

   C $\dfrac{5}{6}$

   D $\dfrac{9}{5}$

M02048

5. Which of the following numerical expressions results in a negative number?

   A $(-7) + (-3)$

   B $(-3) + (7)$

   C $(3) + (7)$

   D $(3) + (-7) + (11)$

M00116

6. One hundred is multiplied by a number between 0 and 1. The answer has to be

   A   less than 0.

   B   between 0 and 50 but not 25.

   C   between 0 and 100 but not 50.

   D   between 0 and 100.

M00275

— **3** —

Number Sense

7. John uses $\frac{2}{3}$ of a cup of oats per serving to make oatmeal. How many cups of oats does he need to make 6 servings?

   A $2\frac{2}{3}$

   B   4

   C $5\frac{1}{3}$

   D   9

   M23015

8. If Freya makes 4 of her 5 free throws in a basketball game, what is her free throw shooting percentage?

   A   20%
   B   40%
   C   80%
   D   90%

   M00223

9. Some students attend school 180 of the 365 days in a year. About what part of the year do they attend school?

   A   18%
   B   50%
   C   75%
   D   180%

   M00047

10. The cost of an afternoon movie ticket last year was $4.00. This year an afternoon movie ticket costs $5.00. What is the percent increase of the ticket from last year to this year?

    A   10%
    B   20%
    C   25%
    D   40%

    M02158

11. The price of a calculator has decreased from $12.00 to $9.00. What is the percent of decrease?

    A   3%
    B   25%
    C   33%
    D   75%

    M02868

12. The weekly sales of a magazine increased from 500,000 to 600,000. By what percent did the magazine sales increase?

    A   17%
    B   20%
    C   83%
    D   120%

    M11242

13. Sally puts $200.00 in a bank account. Each year the account earns 8% simple interest. How much interest will be earned in three years?

    A $16.00
    B $24.00
    C $48.00
    D $160.00

    M02119

14. A pair of jeans regularly sells for $24.00. They are on sale for 25% off. What is the sale price of the jeans?

    A $6.00

    B $18.00

    C $20.00

    D $30.00

<div align="right">M02870</div>

15. A CD player regularly sells for $80. It is on sale for 20% off. What is the sale price of the CD player?

    A $16

    B $60

    C $64

    D $96

<div align="right">M02425</div>

16. Jana bought a car for $4200 and later sold it for a 30% profit. How much did Jana sell the car for?

    A $1260

    B $2940

    C $5460

    D $7140

<div align="right">M10580</div>

17. A salesperson at a clothing store earns a 2% commission on all sales. How much commission does the salesperson earn on a $300 sale?

    A $6

    B $15

    C $60

    D $150

<div align="right">M20470</div>

18. Which number equals $(2)^{-4}$?

    A -8

    B $-\dfrac{1}{16}$

    C $\dfrac{1}{16}$

    D $\dfrac{1}{8}$

<div align="right">M10015</div>

19. $\dfrac{10^{-2}}{10^{-4}} =$

    A 10^{-6}

    B 10^{-2}

    C 10^{2}

    D 10^{8}

<div align="right">M02832</div>

20. Which of the following is equivalent to $7^{-6} \bullet 7^{4}$?

    A 7^{-24}

    B 7^{-10}

    C 7^{-2}

    D 7^{2}

<div align="right">M12679</div>

Number Sense

21. Which fraction is equivalent to $\dfrac{5}{6}+\dfrac{7}{8}$?

   A $\dfrac{35}{48}$

   B $\dfrac{6}{7}$

   C $\dfrac{20}{21}$

   D $\dfrac{41}{24}$

   M12713

22. Which of the following is the prime factored form of the lowest common denominator of $\dfrac{7}{10}+\dfrac{8}{15}$?

   A 5×1
   B $2 \times 3 \times 5$
   C $2 \times 5 \times 3 \times 5$
   D 10×15

   M02826

23. What is $\dfrac{3}{4}-\dfrac{1}{6}$?

   A $\dfrac{1}{6}$

   B $\dfrac{1}{3}$

   C $\dfrac{7}{12}$

   D $\dfrac{11}{12}$

   M13552

24. $(3^8)^2 =$

   A 3^4
   B 3^6
   C 3^{10}
   D 3^{16}

   M02406

25. $4^3 \times 4^2 =$

   A 4^5
   B 4^6
   C 16^5
   D 16^6

   M02661

26. The square root of 150 is between

   A 10 and 11.
   B 11 and 12.
   C 12 and 13.
   D 13 and 14.

   M02666

27. The square of a <u>whole</u> number is between 1,500 and 1,600. The number must be between

   A 30 and 35.
   B 35 and 40.
   C 40 and 45.
   D 45 and 50.

   M00313

— **6** —

28. If $|x| = 3$, what is the value of x?

    A   −3 or 0

    B   −3 or 3

    C   0 or 3

    D   −9 or 9

M02122

29. What is the absolute value of −4?

    A   −4

    B $-\dfrac{1}{4}$

    C $\dfrac{1}{4}$

    D   4

M02667

— **7** —

Number Sense

Question Number	Correct Answer	Standard	School Year of Exam
1	B	7NS1.1	2001-2002
2	C	7NS1.1	2000-2001
3	C	7NS1.2	2001-2002
4	A	7NS1.2	2001-2002
5	A	7NS1.2	2000-2001
6	D	7NS1.2	2000-2001
7	B	7NS1.2	2003-2004
8	C	7NS1.3	2001-2002
9	B	7NS1.3	2000-2001
10	C	7NS1.6	2001-2002
11	B	7NS1.6	2000-2001
12	B	7NS1.6	2004-2005
13	C	7NS1.7	2001-2002
14	B	7NS1.7	2000-2001
15	C	7NS1.7	2000-2001
16	C	7NS1.7	2003-2004
17	A	7NS1.7	2004-2005
18	C	7NS2.1	2002-2003
19	C	7NS2.1	2001-2002
20	C	7NS2.1	2003-2004
21	D	7NS2.2	2002-2003
22	B	7NS2.2	2000-2001
23	C	7NS2.2	2003-2004
24	D	7NS2.3	2001-2002
25	A	7NS2.3	2000-2001
26	C	7NS2.4	2001-2002
27	B	7NS2.4	2000-2001
28	B	7NS2.5	2001-2002
29	D	7NS2.5	2000-2001

STATISTICS, DATA ANALYSIS, AND PROBABILITY

The following seven California mathematics academic content standards from the Statistics, Data Analysis, and Probability strand are assessed on the CAHSEE by 12 test questions and are represented in this booklet by 23 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 6 — STATISTICS, DATA ANALYSIS, AND PROBABILITY	
Standard Set 1.0	**Students compute and analyze statistical measurements for data sets:**
1.1	Compute the ~~range~~, mean, median, and mode of data sets.*
Standard Set 2.0	**Students use data samples of a population and describe the characteristics and limitations of the samples:**
2.5	Identify claims based on statistical data and, in simple cases, evaluate the validity of the claims.
Standard Set 3.0	**Students determine theoretical and experimental probabilities and use these to make predictions about events:**
3.1	Represent all possible outcomes for compound events in an organized way (e.g., tables, grids, tree diagrams) and express the theoretical probability of each outcome.
3.3	Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if P is the probability of an event, $1 - P$ is the probability of an event not occurring.
3.5	Understand the difference between independent and dependent events.
GRADE 7 — STATISTICS, DATA ANALYSIS, AND PROBABILITY	
Standard Set 1.0	**Students collect, organize, and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet software program:**
1.1	Know various forms of display for data sets, ~~including a stem-and-leaf plot or box-and- whisker plot;~~ use the forms to display a single set of data or to compare two sets of data.*
1.2	Represent two numerical variables on a scatterplot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables (e.g., between time spent on homework and grade level).

* The crossed-out portion of this standard is not assessed on the CAHSEE, but is still included in grade-level standards.

30. Donald priced six personal Compact Disc (CD) players. The prices are shown below.

$21.00, $23.00, $21.00, $39.00, $25.00, $31.00

What is the median price?

A $21.00

B $24.00

C $27.00

D $30.00

M02964

31. Rico's first three test scores in biology were 65, 90, and 73. What was his mean score?

A 65

B 73

C 76

D 90

M02247

32. The chart below shows the mathematics test scores of three students.

Mathematics Test Scores

	Test 1	Test 2	Test 3	Test 4
Parisa	7	8	10	6
Hector	6	7	9	10
Charles	8	10	10	9

What is Hector's mean score?

A 6

B 7

C 8

D 9

M00124

33. The box below shows the number of kilowatt-hours of electricity used last month at each of the houses on Harris Street.

620, 570, 570, 590, 560, 640, 590, 590, 580

What is the mode of these data?

A 560

B 580

C 590

D 640

M12248

34. The Smithburg town library wanted to see what types of books were borrowed most often.
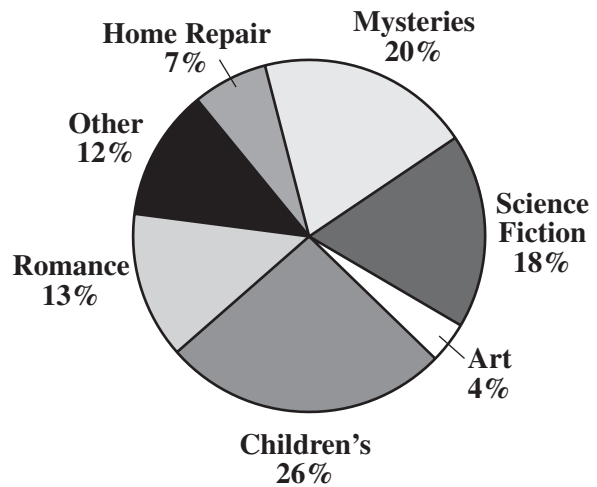
According to the circle graph shown above—

A more Children's books were borrowed than Romance and Science Fiction combined.

B more than half of the books borrowed were Children's, Mysteries, and Art combined.

C more Mysteries were borrowed than Art and Science Fiction combined.

D more than half of the books borrowed were Romance, Mysteries, and Science Fiction combined.

M02131

— **10** —

Statistics, Data Analysis, and Probability

35. Three-fourths of the 36 members of a club attended a meeting. Ten of those attending the meeting were female. Which one of the following questions can be answered with the information given?

  A How many males are in the club?

  B How many females are in the club?

  C How many male members of the club attended the meeting?

  D How many female members of the club did not attend the meeting?

M00261

36. The number of games won over four years for three teams is shown on the graph below.
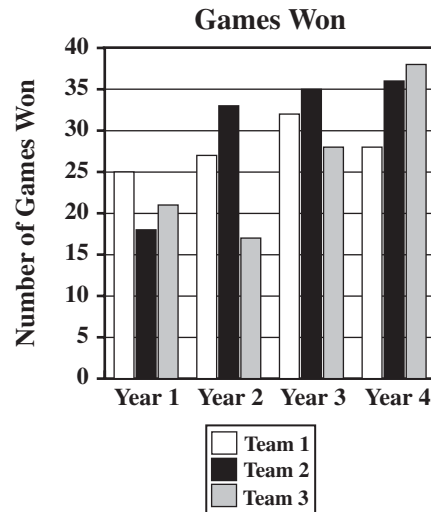
Games Won

Which statement is true based on this information?

  A Team 3 always came in second.

  B Team 1 had the best average overall.

  C Team 1 always won more games than Team 3.

  D Team 2 won more games each year than in the previous year.

M10300

— **11** —

37. To get home from work, Curtis must get on one of the three highways that leave the city. He then has a choice of four different roads that lead to his house. In the diagram below, each letter represents a highway, and each number represents a road.

Highway

	A	B	C
1	A 1	B 1	C 1
2	A 2	B 2	C 2
3	A 3	B 3	C 3
4	A 4	B 4	C 4

Road

If Curtis randomly chooses a route to travel home, what is the probability that he will travel Highway B and Road 4?

A $\dfrac{1}{16}$

B $\dfrac{1}{12}$

C $\dfrac{1}{4}$

D $\dfrac{1}{3}$

M02512

38. The table below shows all of the possible outcomes when flipping three fair coins at the same time.

First Coin	Second Coin	Third Coin
H	H	H
H	H	T
H	T	H
H	T	T
T	H	H
T	H	T
T	T	H
T	T	T

Which of the following statements must be true?

A The probability that exactly two coins have the same outcome is $\dfrac{1}{2}$.

B The probability of getting exactly one tail is higher than getting exactly two tails.

C The probability of getting at least one head is higher than the probability of getting at least one tail.

D The probability that all of the coins will land on heads is the same as the probability that all of the coins will land on tails.

M13243

Statistics, Data Analysis, and Probability

39. Carmen wants to buy a new car. Her choices are a 2-door or a 4-door, a convertible top or a hard top, and red, white, or black. Which of the following tree diagrams represents all the possible choices for the car?

A

```
            R
    2 — C <—W
            B
            R
    4 — H <—W
            B
```

C

```
                R
    2 — C — H <—W
                B
                R
    4 — C — H <—W
                B
```

B

```
            R
    2 — 4 <—W
            B
            R
    4 — 2 <—W
            B
```

D

```
              R
         C <—W
              B
      2
              R
         H <—W
              B

              R
         C <—W
              B
      4
              R
         H <—W
              B
```
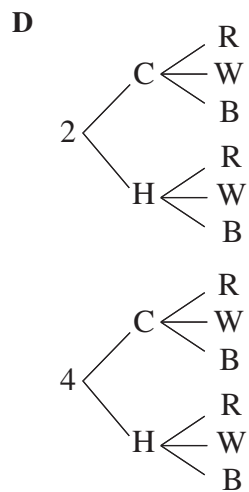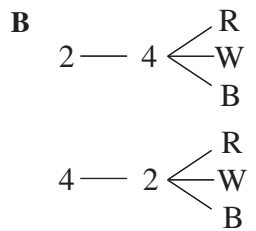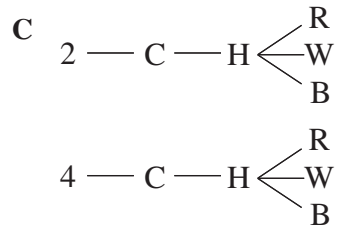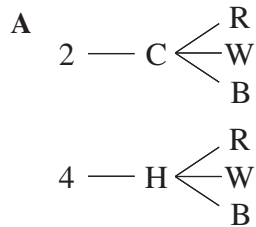
M00406

40. A bucket contains 3 bottles of apple juice, 2 bottles of orange juice, 6 bottles of tomato juice, and 8 bottles of water. If Kira randomly selects a bottle, what is the probability that she will select a drink other than water?

A $\dfrac{3}{4}$

B $\dfrac{11}{19}$

C $\dfrac{8}{19}$

D $\dfrac{1}{4}$

M11379
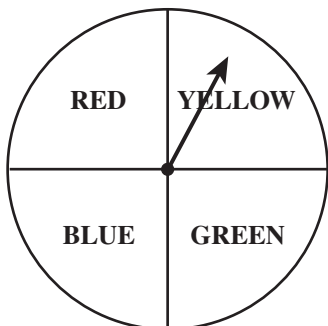
41. The spinner shown above is fair. What is the probability that the spinner will <u>not</u> stop on red if you spin it one time?

A $\dfrac{1}{4}$

B $\dfrac{1}{3}$

C $\dfrac{3}{4}$

D $\dfrac{4}{3}$

M00094

42. Fran has 16 CDs in a box: 6 country, 6 rock, 2 dance, and 2 classical. If she takes out one CD without looking, what is the probability that she will pick a rock or country CD?

A 25%

B 50%

C 75%

D 100%

M12305

43. Mr. Gulati is holding five cards numbered 1 through 5. He has asked five students to each randomly pick a card to see who goes first in a game. Whoever picks the card numbered 5 goes first. Juanita picks first, gets the card numbered 4, and keeps the card. What is the probability that Yoko will get the card numbered 5 if she picks second?

A $\dfrac{1}{2}$

B $\dfrac{1}{3}$

C $\dfrac{1}{4}$

D $\dfrac{1}{5}$

M02145

— **14** —

44. A bag contained four green balls, three red balls, and two purple balls. Jason removed one purple ball from the bag and did <u>not</u> put the ball back in the bag. He then randomly removed another ball from the bag. What is the probability that the second ball Jason removed was purple?

A $\dfrac{1}{36}$

B $\dfrac{1}{9}$

C $\dfrac{1}{8}$

D $\dfrac{2}{9}$

M03097

45. Heather flipped a coin five times, and each time it came up heads. If Heather flips the coin one more time, what is the theoretical probability that it will come up tails?

A $\dfrac{1}{6}$

B $\dfrac{1}{2}$

C $\dfrac{3}{5}$

D $\dfrac{5}{6}$

M02171
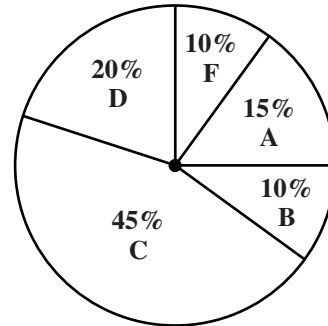
46. The circle graph shown above represents the distribution of the grades of 40 students in a certain geometry class. How many students received As or Bs?

A 6

B 10

C 15

D 20

M00300

Statistics, Data Analysis, and Probability

**Speed of Four Runners
in a 100-Meter Dash**
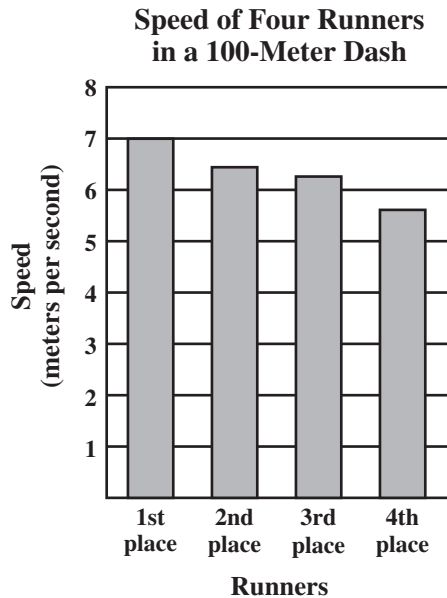
47. Based on the bar graph shown above, which of the following conclusions is true?

A Everyone ran faster than 6 meters per second.

B The best possible rate for the 100-meter dash is 5 meters per second.

C The first-place runner was four times as fast as the fourth-place runner.

D The second-place and third-place runners were closest in time to one another.

M00279

48. The graph below represents the closing price of a share of a certain stock for each day of a week.
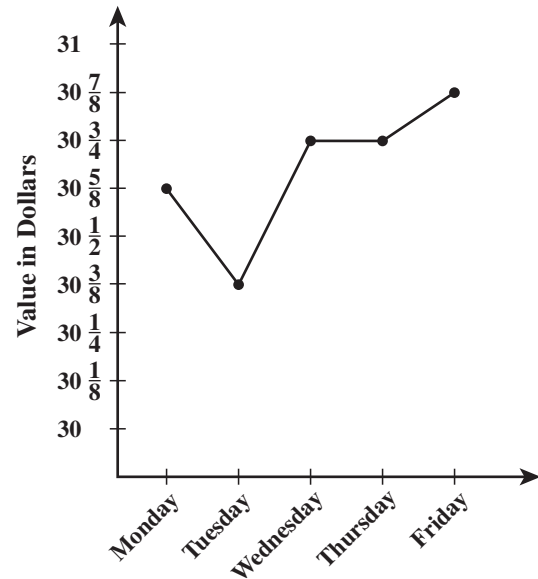
Which day had the greatest increase in the value of this stock over that of the previous day?

A Tuesday

B Wednesday

C Thursday

D Friday

M00295

— **16** —

Statistics, Data Analysis, and Probability

49. **The students at a high school were asked to name their favorite type of art. The table below shows the results of the survey.**

Art Survey

Type of Art	Number of Students
Painting	714
Drawing	709
Sculpture	296
Other	305

Which circle graph BEST shows these data?

A

Other
15%

Sculpture
35%

35%
Painting

15%

Drawing

C

Sculpture
20%

Other
20%

35%
Painting

25%

Drawing

B

Sculpture
15%

Other
15%

35%
Drawing

35%
Painting

D

Other
10%

Sculpture
10%

Drawing
35%

45%
Painting

M13053

— 17 —
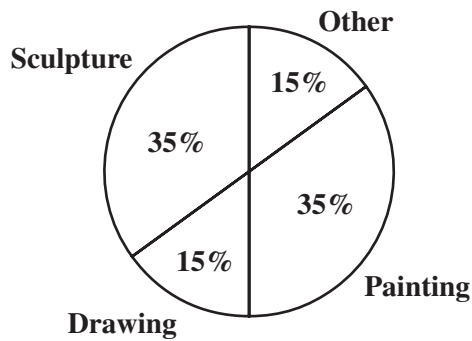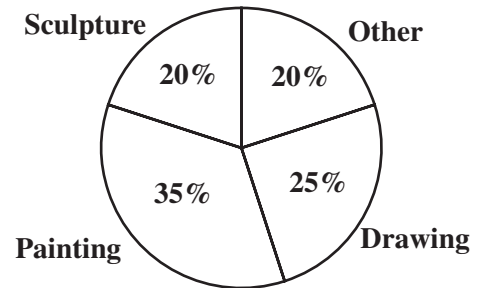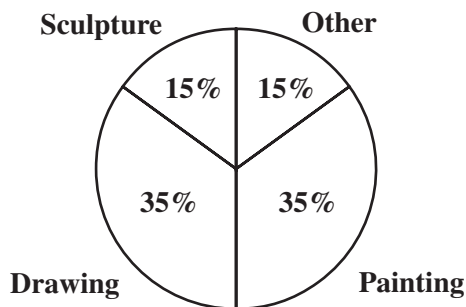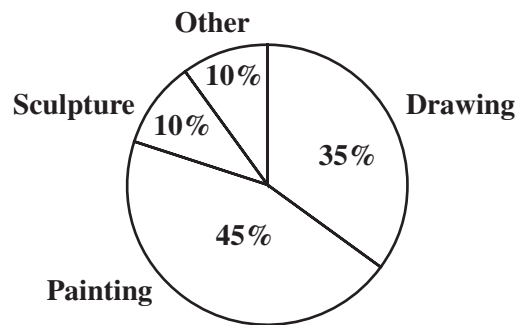
Statistics, Data Analysis, and Probability

50. **Which scatterplot shows a negative correlation?**

A

Number of Books vs Number of Students scatterplot showing points increasing from lower-left to upper-right.

C

Miles Driven vs Number of People scatterplot showing scattered points with no clear pattern.

B

Price per Person vs Number of People scatterplot showing points decreasing from upper-left to lower-right.

D

Cost of Call (cents) vs Number of Minutes scatterplot showing points increasing from lower-left to upper-right.

M02546

Ticket Prices to Funland
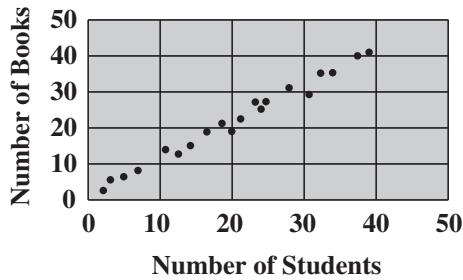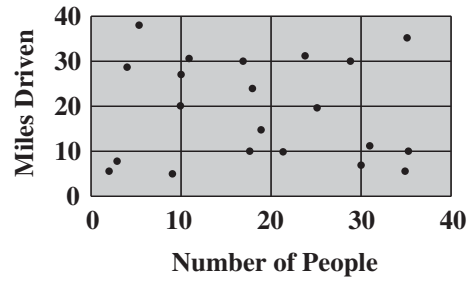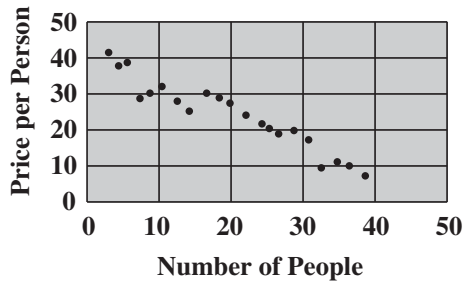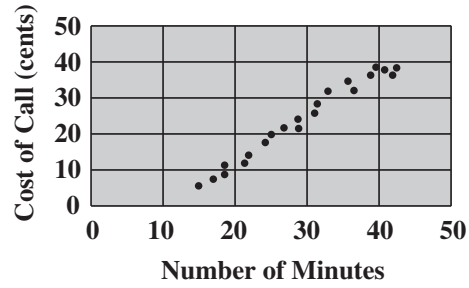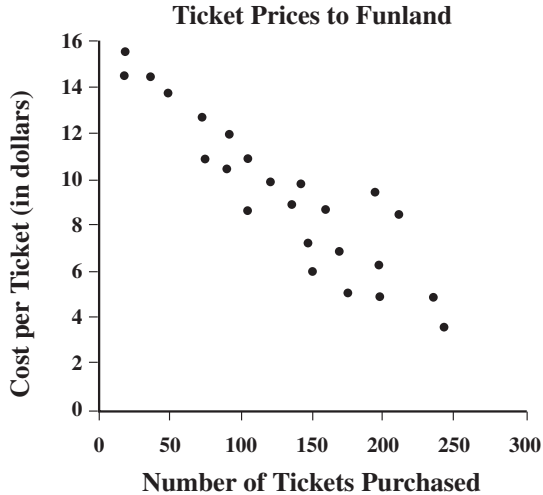
51. **The cost of a ticket to Funland varies according to the season. Which of the following conclusions about the number of tickets purchased and the cost per ticket is best supported by the scatterplot above?**

A The cost per ticket increases as the number of tickets purchased increases.

B The cost per ticket is unchanged as the number of tickets purchased increases.

C The cost per ticket decreases as the number of tickets purchased increases.

D There is no relationship between the cost per ticket and the number of tickets purchased.

M02208

52. **The scatterplot below shows the time cheese has been aging and the amount of lactic acid present in the cheese.**

Lactic Acid in Cheese
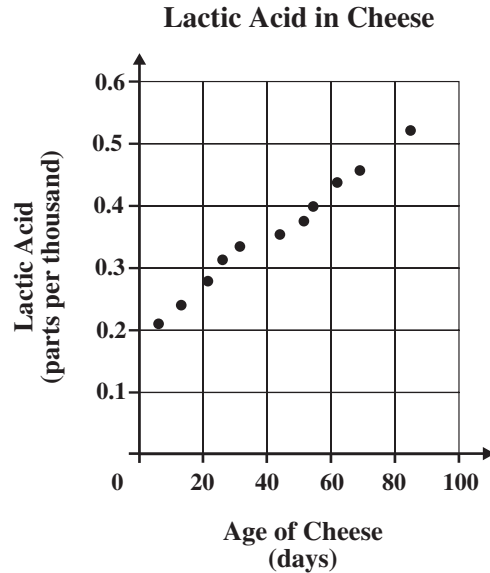
Which statement is MOST strongly supported by the scatterplot?

A The longer cheese ages, the more lactic acid is present.

B The longer cheese ages, the less lactic acid is present.

C The amount of lactic acid present remains constant as cheese ages.

D No relationship exists between the time cheese ages and the amount of lactic acid present.

M22077

Statistics, Data Analysis, and Probability

Question Number	Correct Answer	Standard	School Year of Exam
30	B	6PS1.1	2002-2003
31	C	6PS1.1	2001-2002
32	C	6PS1.1	2000-2001
33	C	6PS1.1	2003-2004
34	D	6PS2.5	2002-2003
35	C	6PS2.5	2001-2002
36	D	6PS2.5	2003-2004
37	B	6PS3.1	2001-2002
38	D	6PS3.1	2003-2004
39	D	6PS3.1	2004-2005
40	B	6PS3.3	2002-2003
41	C	6PS3.3	2000-2001
42	C	6PS3.3	2004-2005
43	C	6PS3.5	2001-2002
44	C	6PS3.5	2001-2002
45	B	6PS3.5	2000-2001
46	B	7PS1.1	2002-2003
47	D	7PS1.1	2001-2002
48	B	7PS1.1	2000-2001
49	B	7PS1.1	2004-2005
50	B	7PS1.2	2001-2002
51	C	7PS1.2	2000-2001
52	A	7PS1.2	2003-2004

ALGEBRA AND FUNCTIONS

The following ten California mathematics academic content standards from the Algebra and Functions strand are assessed on the CAHSEE by 17 test questions and are represented in this booklet by 30 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — ALGEBRA AND FUNCTIONS	
Standard Set 1.0	**Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs:**
1.1	Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).
1.2	Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.
1.5	Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph.
Standard Set 2.0	**Students interpret and evaluate expressions involving integer powers and simple roots:**
2.1	Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.
2.2	Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent.
Standard Set 3.0	**Students graph and interpret linear and some nonlinear functions:**
3.1	Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems.
3.3	Graph linear functions, noting that the vertical change (change in y-value) per unit of horizontal change (change in x-value) is always the same and know that the ratio ("rise over run") is called the slope of a graph.
3.4	Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.
Standard Set 4.0	**Students solve simple linear equations and inequalities over the rational numbers:**
4.1	Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.
4.2	Solve multistep problems involving rate, average speed, distance, and time or a direct variation.

— 21 —

Algebra and Functions

53. Which of the following inequalities represents the statement, "A number, x, decreased by 13 is less than or equal to 39"?

  A $13 - x \geq 39$

  B $13 - x \leq 39$

  C $x - 13 \leq 39$

  D $x - 13 < 39$

M03049

54. A shopkeeper has x kilograms of tea in stock. He sells 15 kilograms and then receives a new shipment weighing $2y$ kilograms. Which expression represents the weight of the tea he now has?

  A $x - 15 - 2y$

  B $x + 15 + 2y$

  C $x + 15 - 2y$

  D $x - 15 + 2y$

M00110

55. Divide a number by 5 and add 4 to the result. The answer is 9.

Which of the following equations matches these statements?

  A $4 = 9 + \dfrac{n}{5}$

  B $\dfrac{n}{5} + 4 = 9$

  C $\dfrac{5}{n} = 4$

  D $\dfrac{n + 4}{5} = 9$

M00050

56. In a certain room, the number of chairs, c, is equal to 3 times the number of tables, t.

Which equation matches the information?

  A $3 \cdot c = t$

  B $3 \cdot t = c$

  C $3 \cdot c = 3 \cdot t$

  D $c \cdot t = 3$

M00104

57. If $n = 2$ and $x = \dfrac{1}{2}$, then $n(4 - x) =$

  A 1

  B 3

  C 7

  D 10

M00034

58. If $h = 3$ and $k = 4$, then $\dfrac{hk + 4}{2} - 2 =$

  A 6

  B 7

  C 8

  D 10

M00052

— **22** —

Algebra and Functions
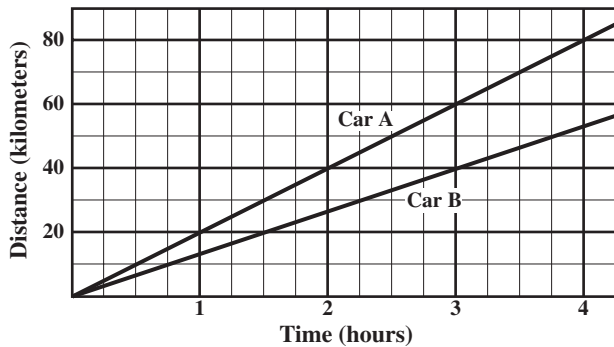
59. After three hours of travel, Car A is about how many kilometers ahead of Car B?

   A   2

   B   10

   C   20

   D   25

M00066

60. The cost of a long distance call charged by each of two telephone companies is shown on the graph below.
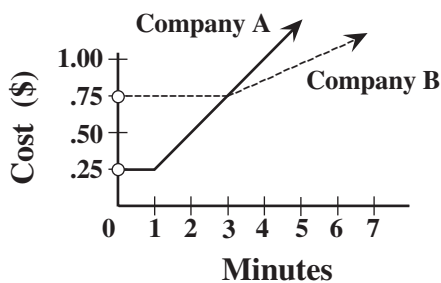
Company A is less expensive than Company B for

   A   all calls.

   B   3 minute calls only.

   C   calls less than 3 minutes.

   D   calls longer than 3 minutes.

M02840

61. The graph below compares the weight of an object on Earth to its weight on the Moon.

An Object's Weight on the Moon
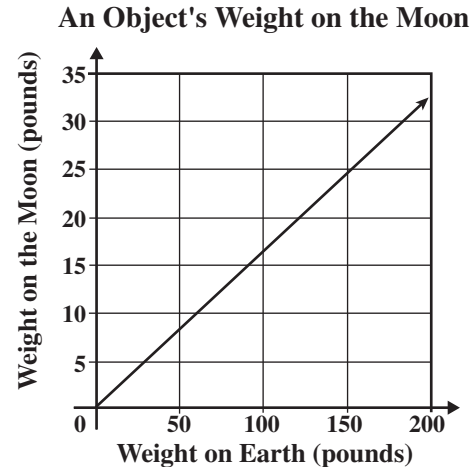
What is the approximate weight on the Moon of an astronaut who weighs 120 pounds on Earth?

   A   15 pounds

   B   20 pounds

   C   25 pounds

   D   30 pounds

M10668

62. $x^3 y^3 =$

   A $9xy$

   B $(xy)^6$

   C $3xy$

   D $xxxyyy$

M02879

Algebra and Functions

63. What does x^5 equal when $x = -2$?

   A -32

   B -10

   C $-\dfrac{1}{32}$

   D 32

M12857

64. Which of the following is equivalent to $(6x-2)(6x-2)(6x+2)$?

   A $(6x-2)^3$

   B $(6x+2)^3$

   C $2(6x-2)(6x+2)$

   D $(6x-2)^2\,(6x+2)$

M12845

65. $\sqrt{4x^4} =$

   A 2

   B $2x$

   C $4x$

   D $2x^2$

M03067

66. Simplify the expression shown below.

$$(5x^2z^2)(8xz^3)$$

   A $40x^2z^6$

   B $40x^3z^5$

   C $40x^3z^6$

   D $40x^5z^5$

M02009

67. Simplify the expression shown below.

$$(6a^4bc)(7ab^3c)$$

   A $13a^4b^3c$

   B $13a^5b^4c^2$

   C $42a^4b^3c$

   D $42a^5b^4c^2$

M02109

68. Which expression is equivalent to $7a^2b \cdot 7bc^2$?

   A $14a^2b^2c^2$

   B $49a^2bc^2$

   C $49a^2b^2c^2$

   D $343a^2b^2c^2$

M12872

— **24** —

69. Which of the following is the graph of $y = \frac{1}{4}x^2$?

A

C

B

D

M03210

— **25** —
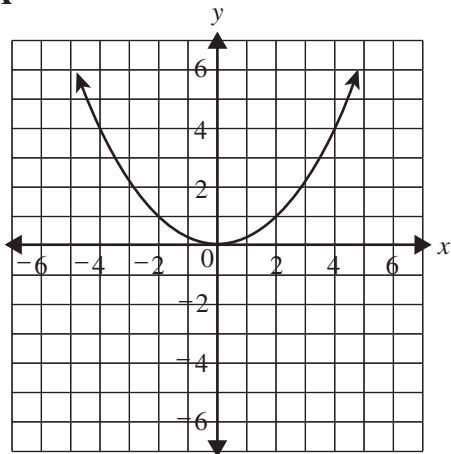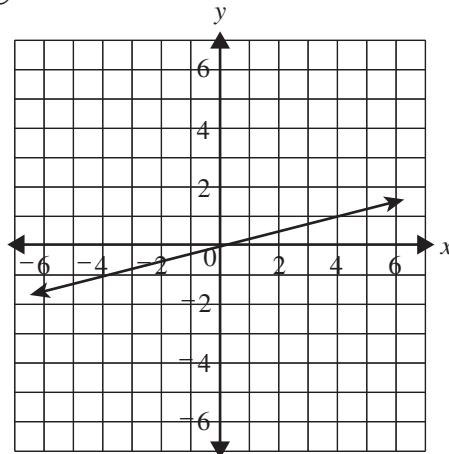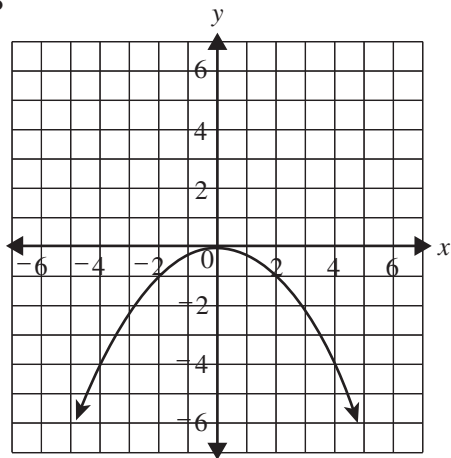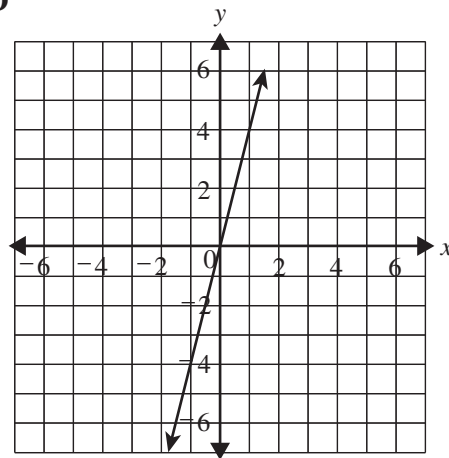
70. Which of the following could be the graph of $y = x^3$?

A

C

B

D
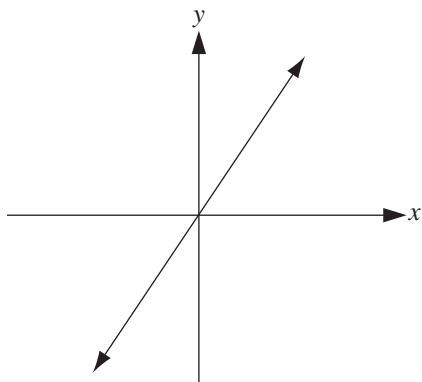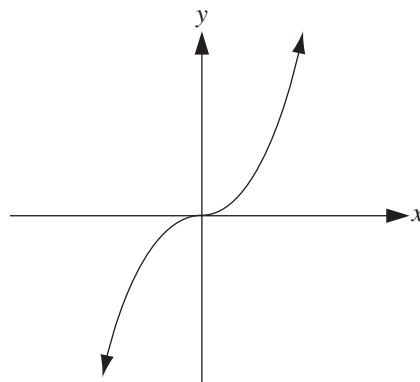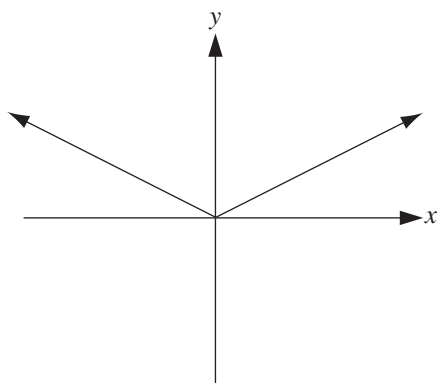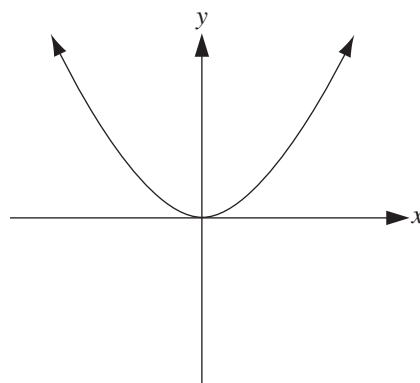
M02200
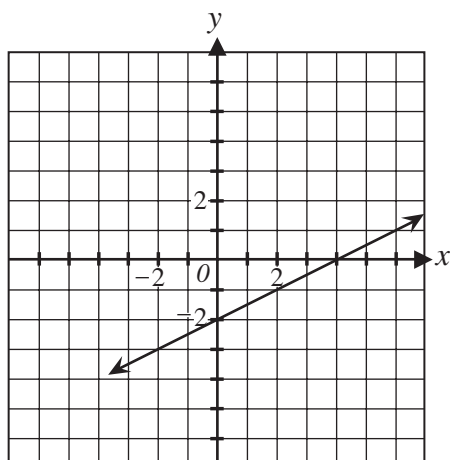
71. What is the slope of the line shown in the graph above?

A -2

B $-\dfrac{1}{2}$

C $\dfrac{1}{2}$

D 2

M02556

72. The slope of the line shown below is $\dfrac{2}{3}$.
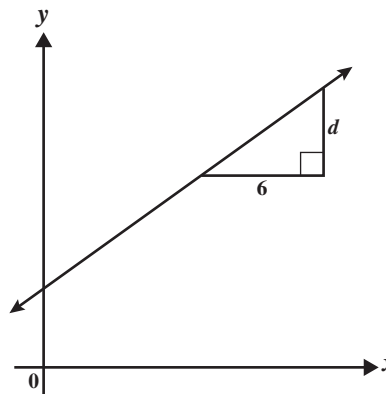
What is the value of *d*?

A   3

B   4

C   6

D   9

M02078

— **27** —

73. What is the equation of the graph shown below?
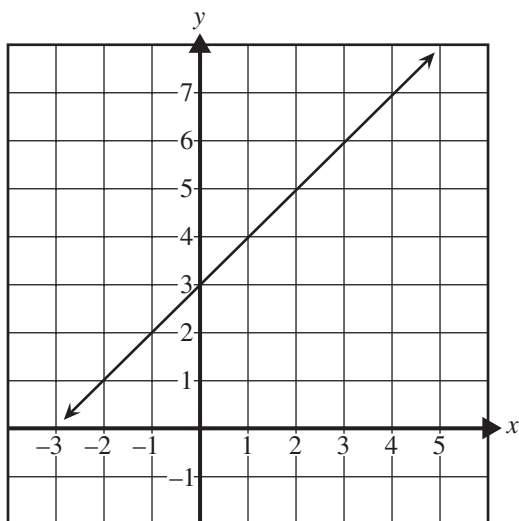
A $y = x - 1$

B $y = x + 1$

C $y = x + 3$

D $y = x - 3$

M02035

74. What is the slope of the line below?
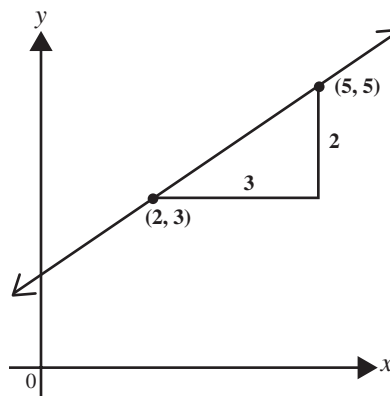
A $-\dfrac{3}{2}$

B $-\dfrac{2}{3}$

C $\dfrac{2}{3}$

D $\dfrac{3}{2}$

M02077

75. The graph below shows Francine's electric bill for 4 different months. What is the price per kilowatt-hour of Francine's electricity?

Monthly Electric Bill
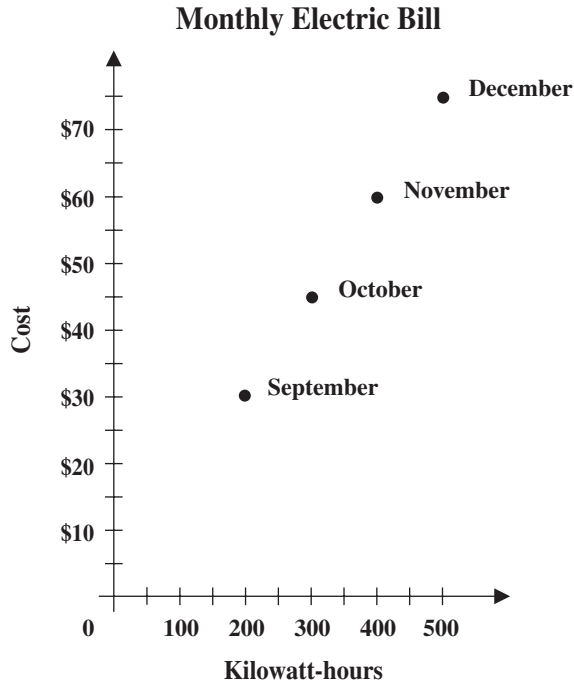
- **A** $0.15
- **B** $0.30
- **C** $1.50
- **D** $6.67

M02681

76. In the inequality $2x + \$10,000 \geq \$70,000$, x represents the salary of an employee in a school district. Which phrase most accurately describes the employee's salary?

- **A** At least $30,000
- **B** At most $30,000
- **C** Less than $30,000
- **D** More than $30,000

M02621

77. Solve for x.

$$2x - 3 = 7$$

- **A** –5
- **B** –2
- **C** 2
- **D** 5

M02771

— **29** —

78. Solve for *n*.

$$2n + 3 < 17$$

  A $n < 2$

  B $n < 3$

  C $n < 5$

  D $n < 7$

M02040

79. The owner of an apple orchard ships apples in boxes that weigh 2 kilograms (kg) when empty. The average apple weighs 0.25 kg, and the total weight of a box filled with apples is 12 kg. How many apples are packed in each box?

  A   14

  B   40

  C   48

  D   56

M10327

80. Stephanie is reading a 456-page book. During the past 7 days she has read 168 pages. If she continues reading at the same rate, how many more days will it take her to complete the book?

  A   12

  B   14

  C   19

  D   24

M00380

81. Robert's toy car travels at 40 centimeters per second (cm/sec) at high speed and 15 cm/sec at low speed. If the car travels for 15 seconds at high speed and then 30 seconds at low speed, what distance would the car have traveled?

  A   1050 cm

  B   1200 cm

  C   1425 cm

  D   2475 cm

M10748

82. Sara can ride her bicycle 3 miles in 15 minutes. At this rate, how many miles can she ride her bicycle in 50 minutes?

  A   5

  B   10

  C   15

  D   20

M12177

— **30** —

Question Number	Correct Answer	Standard	School Year of Exam
53	C	7AF1.1	2001-2002
54	D	7AF1.1	2001-2002
55	B	7AF1.1	2000-2001
56	B	7AF1.1	2000-2001
57	C	7AF1.2	2002-2003
58	A	7AF1.2	2000-2001
59	C	7AF1.5	2001-2002
60	C	7AF1.5	2000-2001
61	B	7AF1.5	2004-2005
62	D	7AF2.1	2001-2002
63	A	7AF2.1	2003-2004
64	D	7AF2.1	2004-2005
65	D	7AF2.2	2001-2002
66	B	7AF2.2	2000-2001
67	D	7AF2.2	2000-2001
68	C	7AF2.2	2004-2005
69	A	7AF3.1	2002-2003
70	C	7AF3.1	2000-2001
71	C	7AF3.3	2001-2002
72	B	7AF3.3	2001-2002
73	C	7AF3.3	2000-2001
74	C	7AF3.3	2000-2001
75	A	7AF3.4	2003-2004
76	A	7AF4.1	2001-2002
77	D	7AF4.1	2001-2002
78	D	7AF4.1	2000-2001
79	B	7AF4.1	2003-2004
80	A	7AF4.2	2001-2002
81	A	7AF4.2	2003-2004
82	B	7AF4.2	2004-2005

MEASUREMENT AND GEOMETRY

The following ten California mathematics academic content standards from the Measurement and Geometry strand are assessed on the CAHSEE by 17 test questions and are represented in this booklet by 35 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — MEASUREMENT AND GEOMETRY	
Standard Set 1.0	**Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:**
1.1	Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).
1.2	Construct and read drawings and models made to scale.
1.3	Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.
Standard Set 2.0	**Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area and volume are affected by changes of scale:**
2.1	Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders.
2.2	Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into more basic geometric objects.
2.3	Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and volume is multiplied by the cube of the scale factor.
2.4	Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [1 ft^2] = [144 in^2], 1 cubic inch is approximately 16.38 cubic centimeters or [1 in^3] = [16.38 cm^3]).

Measurement and Geometry

Standard Set 3.0	Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:
3.2	Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections.
3.3	Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.
3.4	Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about the relationships between the sides and angles of the two figures.

83. One millimeter is—

A $\frac{1}{1000}$ of a meter.

B $\frac{1}{100}$ of a meter.

C 100 meters.

D 1000 meters.

M00276

84. A boy is two meters tall. About how tall is the boy in feet (ft) and inches (in.)? $\left(1 \text{ meter} \approx 39 \text{ inches.}\right)$

A 5 ft 0 in.

B 5 ft 6 in.

C 6 ft 0 in.

D 6 ft 6 in.

M02044

85. Juanita exercised for one hour. How many <u>seconds</u> did Juanita exercise?

    A   60

    B   120

    C   360

    D 3,600

M03074

86. If Jill is driving at 65 miles per hour, what is her approximate speed in kilometers per hour? $\left(1 \text{ mile} \approx 1.6 \text{ kilometers}\right)$

    A   16

    B   41

    C 104

    D 173

M13251

87. The actual width (w) of a rectangle is 18 centimeters (cm). Use the scale drawing of the rectangle to find the actual length (l).
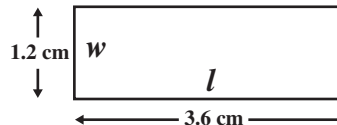
    A   6 cm

    B 24 cm

    C 36 cm

    D 54 cm

M02087

— **34** —

88. The scale drawing of the basketball court shown below is drawn using a scale of 1 inch (in.) = 24 feet (ft).
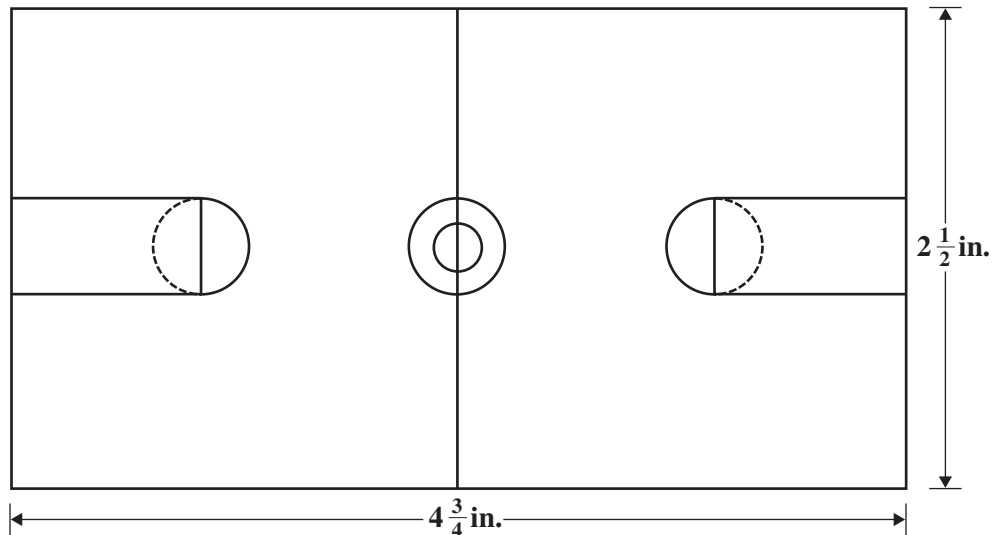
What is the length, in feet, of the basketball court?

A   90 ft

B   104 ft

C   114 ft

D   120 ft

M02233

89. Sixty miles per hour is the same rate as which of the following?

A 1 mile per minute

B 1 mile per second

C 6 miles per minute

D 360 miles per second

90. Beverly ran six miles at the speed of four miles per hour. How long did it take her to run that distance?

A $\frac{2}{3}$ hr

B $1\frac{1}{2}$ hrs

C 4 hrs

D 6 hrs

91. Marcus can type about 42 words per minute. If he types at this rate for 30 minutes without stopping, about how many words will he type?

A 1260

B 2100

C 2520

D 4200

92. A landscaper estimates that landscaping a new park will take 1 person 48 hours. If 4 people work on the job and they each work 6-hour days, how many days are needed to complete the job?

A 2

B 4

C 6

D 8
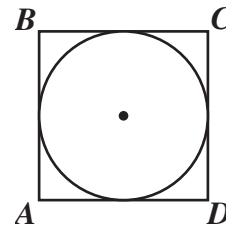
93. In the figure above, the radius of the inscribed circle is 6 inches (in.). What is the perimeter of square *ABCD*?

A 12π in.

B 36π in.

C 24 in.

D 48 in.
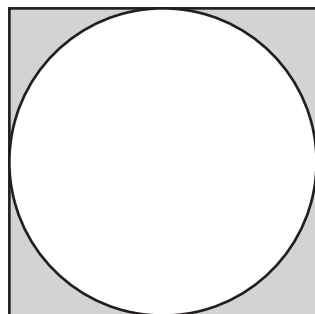
10 feet

94. **The largest possible circle is to be cut from a 10-foot square board. What will be the approximate area, in square feet, of the remaining board (shaded region)?**
(A $= \pi r^2$ and $\pi \approx 3.14$)

A   20

B   30

C   50

D   80

M00404
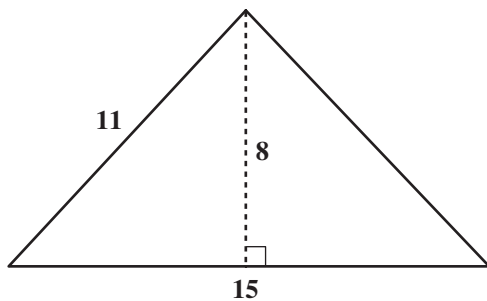
95. **What is the area of the triangle shown above?**

A   44 square units

B   60 square units

C   88 square units

D   120 square units

M00101

236 ft
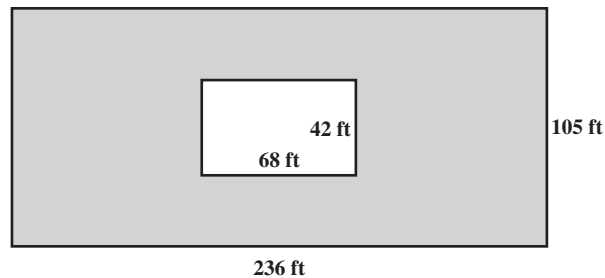
96. **A rectangular pool 42 feet by 68 feet is on a rectangular lot 105 feet by 236 feet. The rest of the lot is grass. Approximately how many square feet is grass?**

A   2,100

B   2,800

C   21,000

D   28,000

M00311
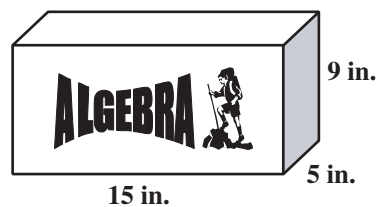
97. **What is the volume of the shoebox shown above in cubic inches (in.^{3})?**

A   29

B   75

C   510

D   675

M02629

— 37 —

98. One-inch cubes are stacked as shown in the drawing below.

1 in.

1 in.

1 in.
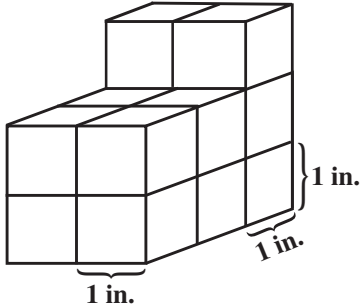
What is the <u>total</u> surface area?

A 19 in.^{2}

B 29 in.^{2}

C 32 in.^{2}

D 38 in.^{2}

M02812

13

7

4

5

2

99. In the figure shown above, all the corners form right angles. What is the area of the figure in square units?

A 67

B 73

C 78

D 91

M00318

100. What is the area of the shaded region in the figure shown below?

2 cm

2 cm

2 cm

2 cm

A 4 cm^2

B 6 cm^2

C 8 cm^2

D 16 cm^2

M02814

101. A right triangle is removed from a rectangle as shown in the figure below. Find the area of the remaining part of the rectangle.

2 in.

2 in.

8 in.

8 in.

6 in.
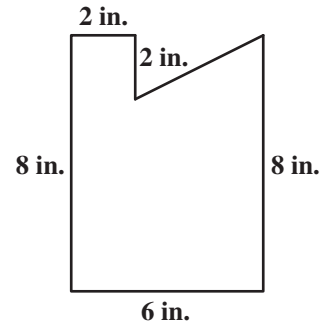
A 40 in.^{2}

B 44 in.^{2}

C 48 in.^{2}

D 52 in.^{2}

M02093

Measurement and Geometry

102. In the figure below, every angle is a right angle.
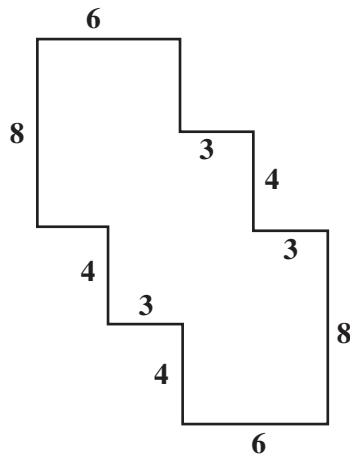
What is the area, in square units, of the figure?

A   96

B   108

C   120

D   144

M10790

103. The short stairway shown below is made of solid concrete. The height and width of each step is 10 inches (in.). The length is 20 inches.
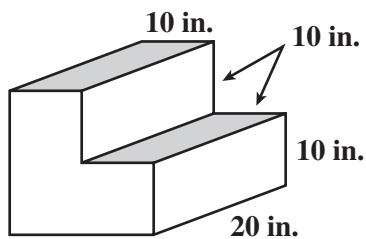
What is the volume, in cubic inches, of the concrete used to create this stairway?

A   3000

B   4000

C   6000

D   8000

M02990
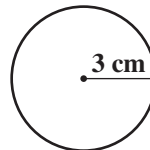
Circle x   **Circle y**
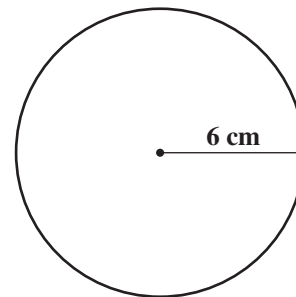
104. The two circles shown above have radii of 3 cm and 6 cm.

What is $\dfrac{\text{Circumference of Circle } x}{\text{Circumference of Circle } y}$?

A $\dfrac{1}{4}$

B $\dfrac{1}{2}$

C $\dfrac{\pi}{4}$

D $\dfrac{\pi}{2}$

M02217

105. Bonni has two similar rectangular boxes. The dimensions of box 1 are twice those of box 2. How many times greater is the volume of box 1 than the volume of box 2?

   A 3

   B 6

   C 8

   D 9

M21061

106. Gina is painting the rectangular tool chest shown in the diagram below.

24 in.

12 in.

10 in.
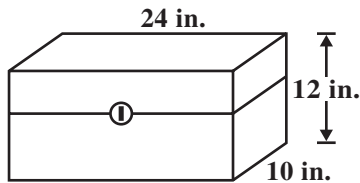
If Gina paints only the outside of the tool chest, what is the total surface area, in square inches $\left(\text{in.}^2\right)$, she will paint?

   A   368

   B   648

   C   1296

   D   2880

M20643

107. The width of the rectangle shown below is 6 <u>inches</u> (in.). The length is 2 <u>feet</u> (ft).

6 in.

2 ft
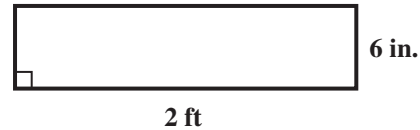
What is the area of the rectangle in square <u>inches</u>?

   A   12

   B   16

   C   60

   D 144

M03243

108. One cubic inch is approximately equal to 16.38 cubic centimeters. Approximately how many cubic centimeters are there in 3 cubic inches?

   A   5.46

   B   13.38

   C   19.38

   D   49.14

M02700

109. A rectangular field is 363 feet long and 240 feet wide. How many acres is the field? $\left(1 \text{ acre} = 43{,}560 \text{ square feet}\right)$

   A 2

   B 3
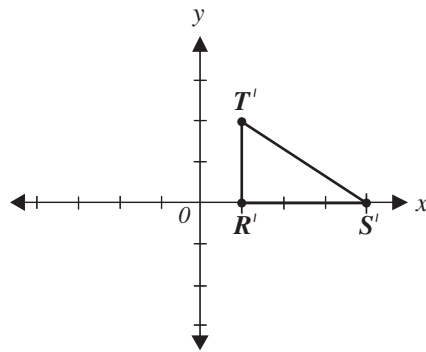
   C 4

   D 5

M13918
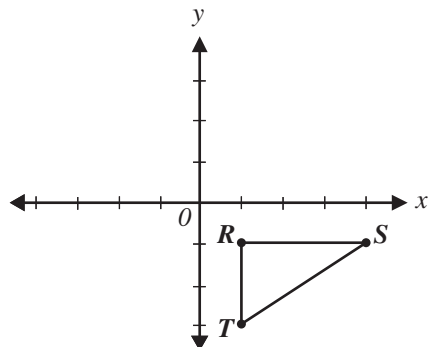
110. Which of the following triangles $R'S'T'$ is the image of triangle *RST* that results from reflecting triangle *RST* across the *y*-axis?
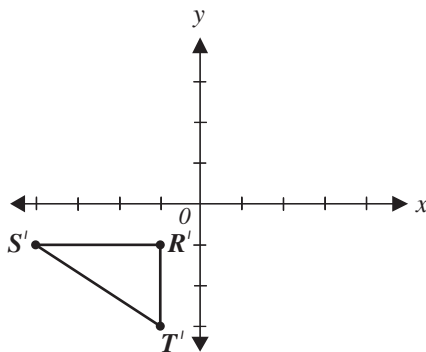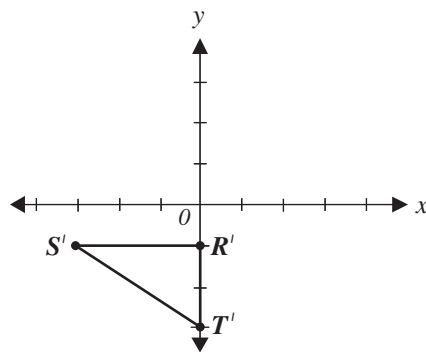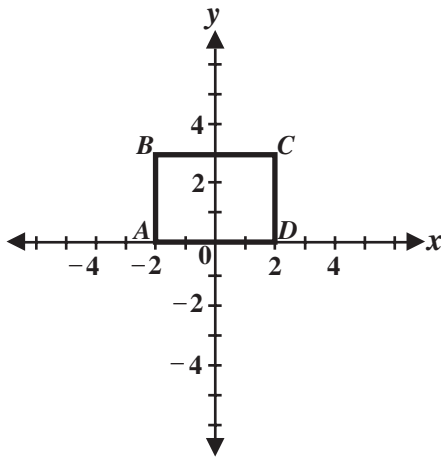
A

C

B

D

M02861

— **41** —
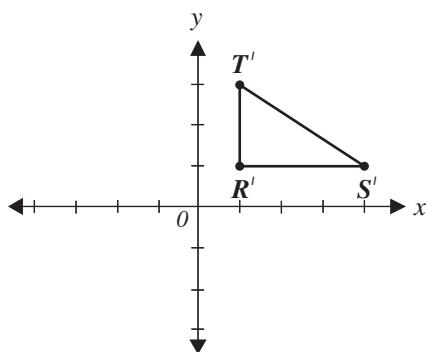
111. The points $(1, 1)$, $(2, 3)$, $(4, 3)$, and $(5, 1)$ are the vertices of a polygon. What type of polygon is formed by these points?

A Triangle

B Trapezoid

C Parallelogram

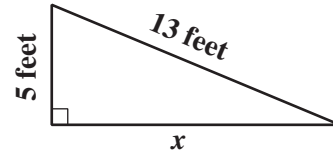**D** Pentagon

M02718

112. The graph of rectangle *ABCD* is shown below.

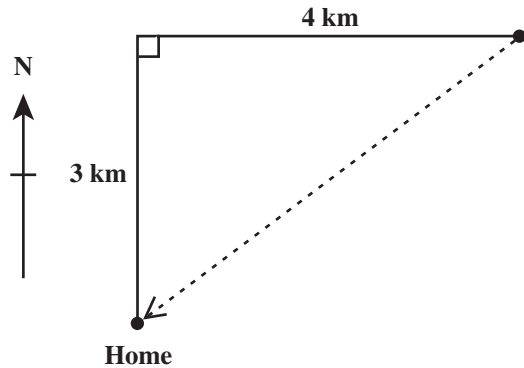What is the area, in square units, of rectangle *ABCD*?

A 6

B 10

C 12

D 14

M03136

113. What is the value of x in the right triangle shown below?

A 8 feet

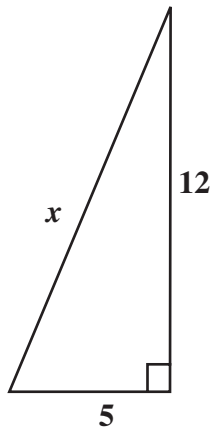**B** 12 feet

C 18 feet

D 23 feet

M03181

114. The club members hiked 3 kilometers north and 4 kilometers east, but then went directly home as shown by the dotted line. How far did they travel to get home?
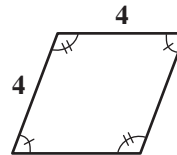
A 4 km

B 5 km

C 6 km
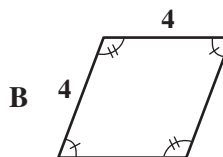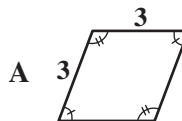
D 7 km

M00120

115. What is the value of *x* in the triangle shown above?

- **A** 11
- **B** 13
- **C** 17
- **D** 169

M02446

116. Which figure is congruent to the figure shown above?

A

B

C

D

M00020

— **43** —
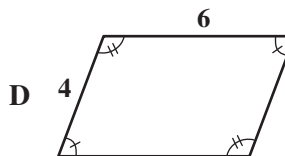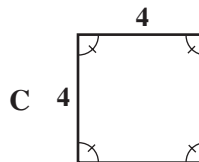
117. In the diagram below, hexagon *LMNPQR* is congruent to hexagon *STUVWX*.
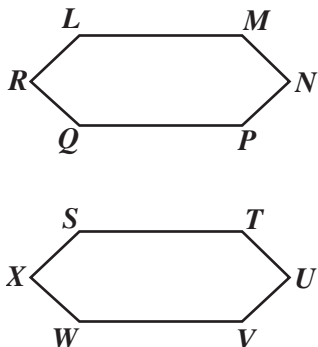
Which side is the same length as $\overline{MN}$?

A   *NP*

B   *TU*

C   *UV*

D   *WX*

M13069

Question Number	Correct Answer	Standard	School Year of Exam
83	A	7MG1.1	2002-2003
84	D	7MG1.1	2001-2002
85	D	7MG1.1	2001-2002
86	C	7MG1.1	2004-2005
87	D	7MG1.2	2001-2002
88	C	7MG1.2	2000-2001
89	A	7MG1.3	2001-2002
90	B	7MG1.3	2001-2002
91	A	7MG1.3	2003-2004
92	A	7MG1.3	2004-2005
93	D	7MG2.1	2001-2002
94	A	7MG2.1	2000-2001
95	B	7MG2.1	2000-2001
96	C	7MG2.1	2000-2001
97	D	7MG2.1	2000-2001
98	D	7MG2.2	2001-2002
99	A	7MG2.2	2001-2002
100	A	7MG2.2	2000-2001
101	B	7MG2.2	2000-2001
102	C	7MG2.2	2004-2005
103	C	7MG2.3	2002-2003
104	B	7MG2.3	2000-2001
105	C	7MG2.3	2003-2004
106	C	7MG2.3	2004-2005
107	D	7MG2.4	2002-2003
108	D	7MG2.4	2000-2001
109	A	7MG2.4	2004-2005
110	B	7MG3.2	2000-2001
111	B	7MG3.2	2000-2001
112	C	7MG3.2	2003-2004
113	B	7MG3.3	2002-2003
114	B	7MG3.3	2001-2002
115	B	7MG3.3	2000-2001
116	B	7MG3.4	2001-2002
117	B	7MG3.4	2003-2004

MATHEMATICAL REASONING

The following six California mathematics academic content standards from the Mathematical Reasoning strand are assessed on the CAHSEE by 8 test questions and are represented in this booklet by 17 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

NOTE: Each question in this strand also addresses a standard in one of the other five strands and is classified by that strand for purposes of reporting student scores. For example, the first question in the following set is classified as 7MR1.1 and also 7MG1.3.

GRADE 7 — MATHEMATICAL REASONING	
Standard Set 1.0	**Students make decisions about how to approach problems:**
1.1	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
1.2	Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed.
Standard Set 2.0	**Students use strategies, skills, and concepts in finding solutions:**
2.1	Use estimation to verify the reasonableness of calculated results.
2.3	Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
2.4	Make and test conjectures by using both inductive and deductive reasoning.
Standard Set 3.0	**Students determine a solution is complete and move beyond a particular problem by generalizing to other situations:**
3.3	Develop generalizations of the results obtained and the strategies used and apply them to new problem situations.

118. Chris drove 100 kilometers from San Francisco to Santa Cruz in 2 hours and 30 minutes. What computation will give Chris' average speed, in kilometers per hour?

A   Divide 100 by 2.5.

B   Divide 100 by 2.3.

C   Multiply 100 by 2.5.

D   Multiply 100 by 2.3.

M03164

A flower shop delivery van traveled these distances during one week: 104.4, 117.8, 92.3, 168.7, and 225.6 miles. How many gallons of gas were used by the delivery van during this week?

119. What other information is needed in order to solve this problem?

A   The average speed traveled in miles per hour

B   The cost of gasoline per gallon

C   The average number of miles per gallon for the van

D   The number of different deliveries the van made

M00138

120. If *n* is any odd number, which of the following is true about $n+1$?

A   It is an odd number.

B   It is an even number.

C   It is a prime number.

D   It is the same number as $n-1$.

M00155

121. The table below shows the flight times from San Francisco (S.F.) to New York (N.Y.).

Leave S.F. Time	Arrive N.Y. Time
8:30 A.M.	4:50 P.M.
12:00 noon	8:25 P.M.
3:30 P.M.	11:40 P.M.
9:45 P.M.	5:50 A.M.

Which flight takes the longest?

A   The flight leaving at 8:30 A.M.

B   The flight leaving at 12:00 noon

C   The flight leaving at 3:30 P.M.

D   The flight leaving at 9:45 P.M.

M00376

122. If *a* is a positive number and *b* is a negative number, which expression is always positive?

A $a-b$

B $a+b$

C $a \times b$

D $a \div b$

M10683

123. The table below shows the number of visitors to a natural history museum during a 4-day period.

Day	Number of Visitors
Friday	597
Saturday	1115
Sunday	1346
Monday	365

Which expression would give the BEST estimate of the total number of visitors during this period?

A $500 + 1100 + 1300 + 300$

B $600 + 1100 + 1300 + 300$

C $600 + 1100 + 1300 + 400$

D $600 + 1100 + 1400 + 400$

M11112

124. Which is the best estimate of 326×279?

A   900

B   9,000

C   90,000

D   900,000

M00277

125. Marcus plans to buy a CD that has a regular price of $13.99. It is on sale for 10% off, but Marcus will have to pay 7% sales tax. Which is the MOST reasonable estimate of the total cost of the CD including tax?
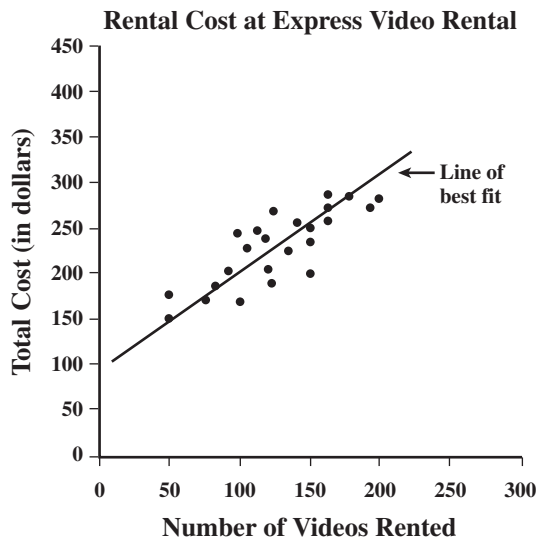
A $12.50

B $13.50

C $14.50

D $15.50

M11869

126. The temperature on a mountain peak was 7 degrees Fahrenheit $(°F)$ at 6:00 p.m. By 8:00 p.m., the temperature had dropped to $0°F$. If the temperature continued to drop at about the same rate, which is the BEST estimate of the temperature at 11:00 p.m.?

A $-20°F$

B $-14°F$

C $-10°F$

D $-9°F$

M20451

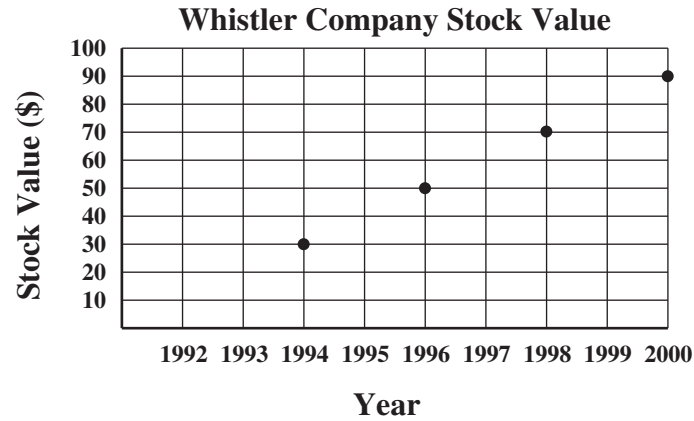**Rental Cost at Express Video Rental**

127. Using the line of best fit shown on the scatterplot above, which of the following best approximates the rental cost per video to rent 300 videos?

A $3.00

B $2.50

C $2.00

D $1.50

M02209

— 48 —

128. The graph below shows the value of Whistler Company stock at the end of every other year from 1994 to 2000.
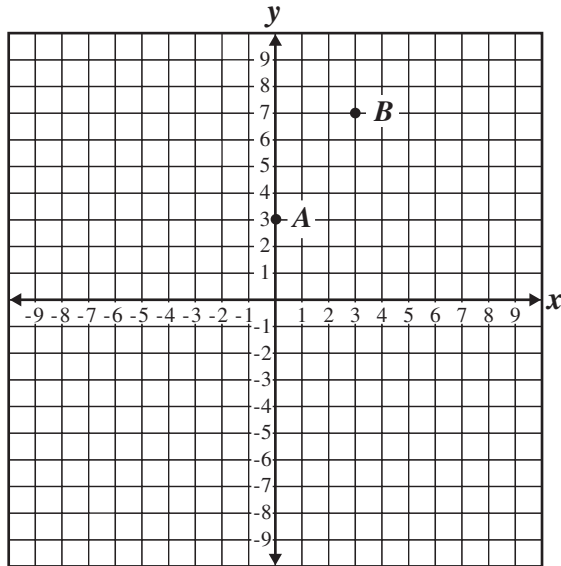
Whistler Company Stock Value

From this graph, which of the following was the most <u>probable</u> value of Whistler Company stock at the end of 1992?

A −$10

B $1

C $10

D $20

M02898

129. If a line passes through the points *A* and *B* shown below, approximately where does the line cross the *x*-axis?

A between -3 and -2

B between 0 and -1

C between 0 and 1

D between 1 and 2

M10702

130. The table below shows values for *x* and corresponding values for *y*.

x	y
21	3
14	2
28	4
7	1

Which of the following represents the relationship between *x* and *y*?

A $y = \dfrac{1}{7}x$

B $y = 7x$

C $y = x - 6$

D $y = x - 18$

M00377

131. The winning number in a contest was less than 50. It was a multiple of 3, 5, and 6. What was the number?

A 14

B 15

C 30

D It cannot be determined.

M00393

— **50** —

132. Lia used the following process to find the slope of the line described by the equation $3y + 5x = 12$.

Step 1:	Subtract $5x$ from each side.	$3y = -5x + 12$
Step 2:	Divide each side by 3.	$y = -\dfrac{5}{3}x + 4$
Step 3:	The slope of $y = mx + b$ is m.	Slope is $-\dfrac{5}{3}$

According to Lia's method, which expression gives the slope of the line described by the equation $ax + by = c$?

A $-\dfrac{a}{b}$

B $\dfrac{a}{b}$

C $-\dfrac{b}{a}$

D $\dfrac{b}{a}$

M11892

Len runs a mile in 8 minutes. At this rate how long will it take him to run a 26-mile marathon?

133. Which of the following problems can be solved using the same arithmetic operations that are used to solve the problem above?

A Len runs 26 miles in 220 minutes. How long does it take him to run each mile?

B A librarian has 356 books to place on 18 shelves. Each shelf will contain the same number of books. How many books can the librarian place on each shelf?

C A cracker box weighs 200 grams. What is the weight of 100 boxes?

D Each basket of strawberries weighs 60 grams. How many baskets can be filled from 500 grams of strawberries?
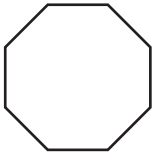
M00137

134. Mia found the area of this shape by dividing it into rectangles as shown.
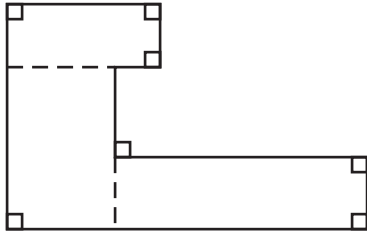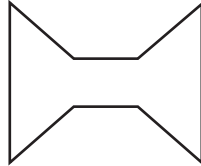

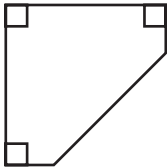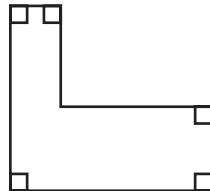Mia could use the same method to find the area for which of these shapes?

A

C

B

D

M25128

Mathematical Reasoning

Question Number	Correct Answer	Standard 1	Standard 2	School Year of Exam
118	A	7MR1.1	7MG1.3	2001-2002
119	C	7MR1.1	7NS1.2	2000-2001
120	B	7MR1.2	7AF1.1	2001-2002
121	B	7MR1.2	7MG1.1	2000-2001
122	A	7MR1.2	7AF1.1	2003-2004
123	C	7MR2.1	7NS1.2	2002-2003
124	C	7MR2.1	7NS1.2	2000-2001
125	B	7MR2.1	7NS1.3	2003-2004
126	C	7MR2.1	7AF4.2	2004-2005
127	D	7MR2.3	7PS1.2	2001-2002
128	C	7MR2.3	7AF1.5	2000-2001
129	A	7MR2.3	7AF3.3	2004-2005
130	A	7MR2.4	7AF1.1	2002-2003
131	C	7MR2.4	7NS1.2	2000-2001
132	A	7MR3.3	7AF4.1	2002-2003
133	C	7MR3.3	7NS1.2	2001-2002
134	D	7MR3.3	7MG2.2	2004-2005

ALGEBRA I

The following ten California mathematics academic content standards from the Algebra I strand are assessed on the CAHSEE by 12 test questions and are represented in this booklet by 30 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

ALGEBRA I	
Standard Set 2.0	Students understand and use such operations as taking the opposite, finding the reciprocal, <u>and</u> taking a root, ~~and raising to a fractional power~~. They understand and use the rules of exponents.*
Standard Set 3.0	Students solve equations and inequalities involving absolute values.
Standard Set 4.0	Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x\text{-}5) + 4(x\text{-}2) = 12$.
Standard Set 5.0	Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.
Standard Set 6.0	Students graph a linear equation and compute the *x*- and *y*- intercepts (e.g., graph $2x + 6y = 4$). ~~They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by 2x + 6y < 4).~~*
Standard Set 7.0	Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations. ~~by using the point-slope formula.~~*
Standard Set 8.0	Students understand the concepts of parallel lines ~~and perpendicular lines~~ and how their slopes are related. ~~Students are able to find the equation of a line perpendicular to a given line that passes through a given point.~~*
Standard Set 9.0	Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.
Standard Set 10.0	Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.
Standard Set 15.0	Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.

* The crossed-out portion of this standard is not assessed on the CAHSEE, but is still included in grade-level standards.

135. If $x = -7$, then $-x =$

    A -7

    B $-\dfrac{1}{7}$

    C $\dfrac{1}{7}$

    D 7

M02863

136. The perimeter, P, of a square may be found by using the formula $\left(\dfrac{1}{4}\right)P = \sqrt{A}$, where A is the area of the square. What is the perimeter of the square with an area of 36 square inches?

    A   9 inches

    B   12 inches

    C   24 inches

    D   72 inches

M00057

137. What is the reciprocal of $\dfrac{ax^2}{y}$?

    A $-\dfrac{ax^2}{y}$

    B $-\dfrac{y}{ax^2}$

    C $\dfrac{ax^2}{y}$

    D $\dfrac{y}{ax^2}$

M13174

138. If x is an integer, what is the solution to $|x - 3| < 1$?

    A $\{-3\}$

    B $\{-3, -2, -1, 0, 1\}$

    C $\{3\}$

    D $\{-1, 0, 1, 2, 3\}$

M03035

139. Assume y is an integer and solve for y.

$$|y + 2| = 9$$

    A $\{-11, 7\}$

    B $\{-7, 7\}$

    C $\{-7, 11\}$

    D $\{-11, 11\}$

M02242

140. If x is an integer, which of the following is the solution set for $3|x| = 1$?

    A $\{0, 5\}$

    B $\{-5, 5\}$

    C $\{-5, 0, 5\}$

    D $\{0, 45\}$

M00059

141. Which of the following is equivalent to $4(x+5)-3(x+2)=14$?

   A $4x+20-3x-6=14$

   B $4x+5-3x+6=14$

   C $4x+5-3x+2=14$

   D $4x+20-3x-2=14$

M02936

142. Which of the following is equivalent to $9-3x>4(2x-1)$?

   A $13<11x$

   B $13>11x$

   C $10>11x$

   D $6x>0$

M02531

$$\frac{20}{x}=\frac{4}{x-5}$$

143. Which of the following is equivalent to the equation shown above?

   A $x(x-5)=80$

   B $20(x-5)=4x$

   C $20x=4(x-5)$

   D $24=x+(x-5)$

M02403

144. Which of the following is equivalent to $1-2x>3(x-2)$?

   A $1-2x>3x-2$

   B $1-2x>3x-5$

   C $1-2x>3x-6$

   D $1-2x>3x-7$

M02231

145. Colleen solved the equation $2(2x+5)=8$ using the following steps.

Given: $2(2x+5)=8$

Step 1: $4x+10=8$

Step 2: $4x=-2$

Step 3: $x=-\dfrac{1}{2}$

To get from Step 2 to Step 3, Colleen—

A   divided both sides by 4.

B   subtracted 4 from both sides.

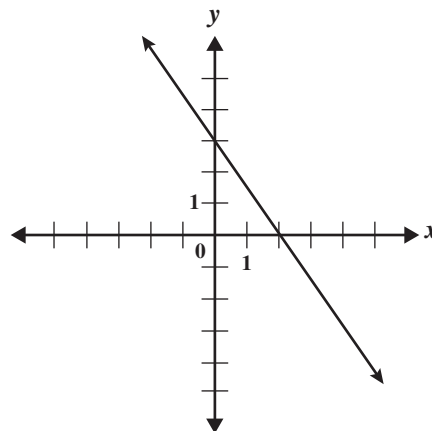C   added 4 to both sides.

D   multiplied both sides by 4.

M03139

146. Solve for x.

$$5(2x-3)-6x<9$$

A $x<-1.5$

B $x<1.5$

C $x<3$

D $x<6$

M02938

147. What is an equation of the line shown in the graph above?

A $y=-\dfrac{3}{2}x+3$

B $y=-\dfrac{2}{3}x+2$

C $y=\dfrac{3}{2}x-3$

D $y=\dfrac{2}{3}x-2$

M00228

— **57** —
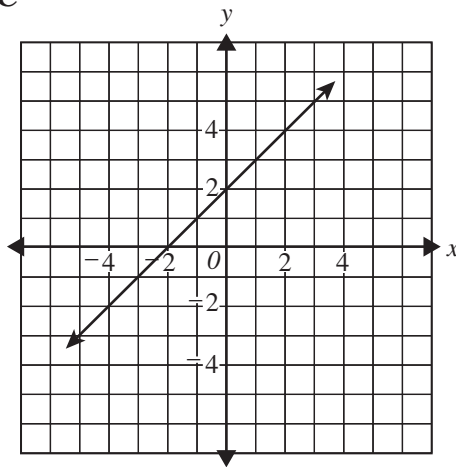
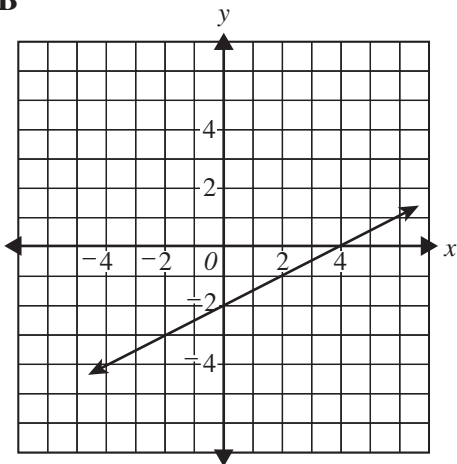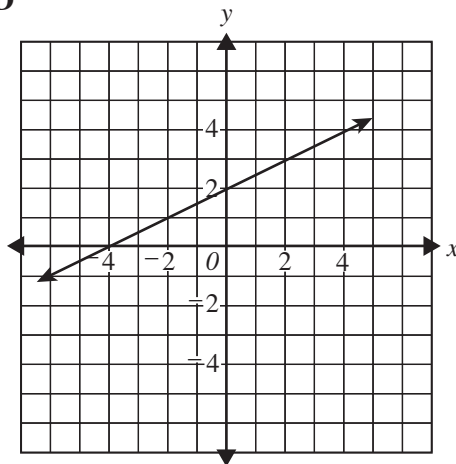**148. Which of the following is the graph of $y = \dfrac{1}{2}x + 2$?**

A

C

B

D
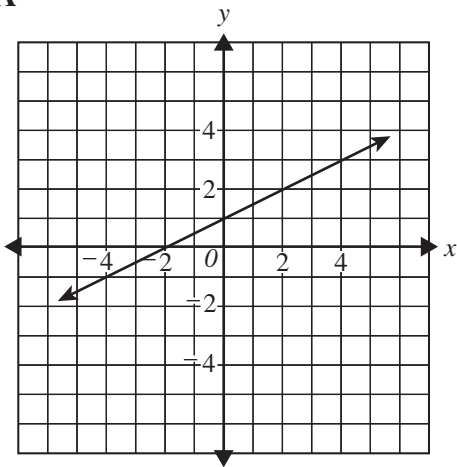
M02026

149. What is the *y*-intercept of the line
$2x - 3y = 12$?

A $(0, -4)$

B $(0, -3)$

C $(2, 0)$

D $(6, 0)$

M02591

150. What are the coordinates of the *x*-intercept of the line $3x + 4y = 12$?

A $(0, 3)$

B $(3, 0)$

C $(0, 4)$

D $(4, 0)$

M02462

151. Which of the following points lies on the line
$y = x$?

A $(-4, -4)$

B $(-4, 4)$

C $(4, -4)$

D $(-4, 0)$

M02594

152. Which of the following points lies on the line
$4x + 5y = 20$?

A $(0, 4)$

B $(0, 5)$

C $(4, 5)$

D $(5, 4)$

M02565

153. What is the slope of a line parallel to the line
$$y = \frac{1}{3}x + 2?$$

A -3

B $-\dfrac{1}{3}$

C $\dfrac{1}{3}$

D 2

M02653

154. Which of the following statements describes parallel lines?

A   Same *y*-intercept but different slopes

B   Same slope but different *y*-intercepts

C   Opposite slopes but same *x*-intercepts
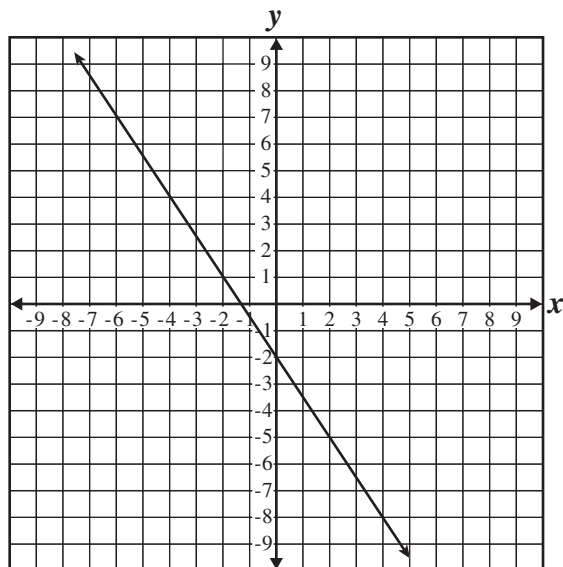
D   Opposite *x*-intercepts but same *y*-intercept

M02610

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155. Which of the following could be the equation of a line parallel to the line $y = 4x - 7$?

A $\quad y = \dfrac{1}{4}x - 7$

B $\quad y = 4x + 3$

C $\quad y = -4x + 3$

D $\quad y = -\dfrac{1}{4}x - 7$

156. What is the slope of a line parallel to the line below?

A $\quad -\dfrac{3}{2}$

B $\quad -\dfrac{2}{3}$

C $\quad \dfrac{2}{3}$

D $\quad \dfrac{3}{2}$

$$\begin{cases} 7x + 3y = -8 \\ -4x - y = 6 \end{cases}$$

157. What is the solution to the system of equations shown above?

A (–2, –2)

B (–2, 2)

C (2, –2)

D (2, 2)

$$\begin{cases} y = 3x - 5 \\ y = 2x \end{cases}$$

158. What is the solution of the system of equations shown above?

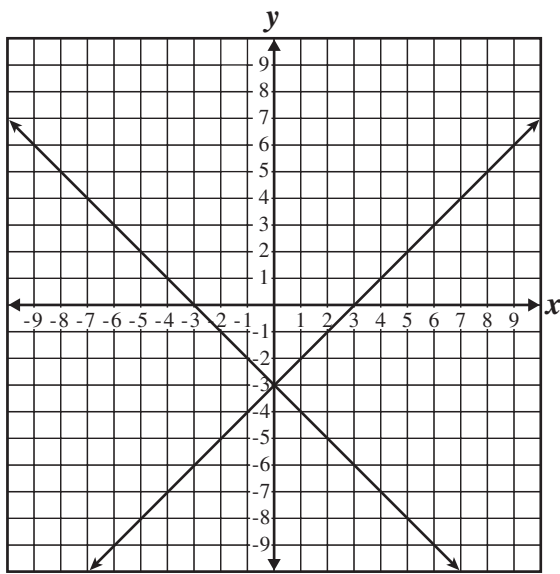A $\quad (1, -2)$

B $\quad (1, 2)$

C $\quad (5, 10)$

D $\quad (-5, -10)$

159. Which graph represents the system of equations shown below?

$$y = -x + 3$$
$$y = x + 3$$

A

C

B

D

M12449

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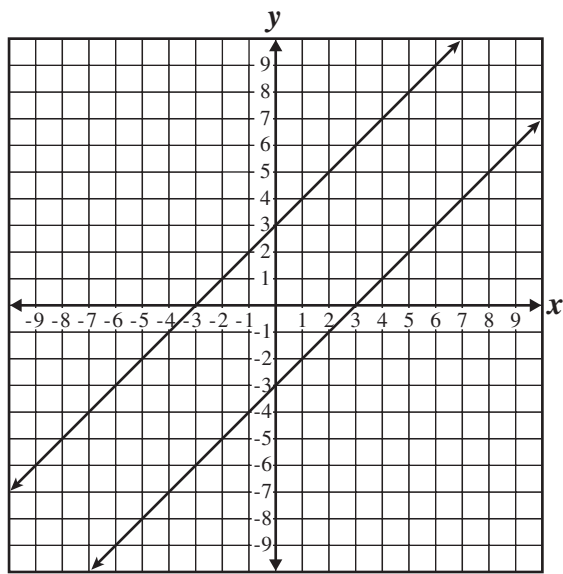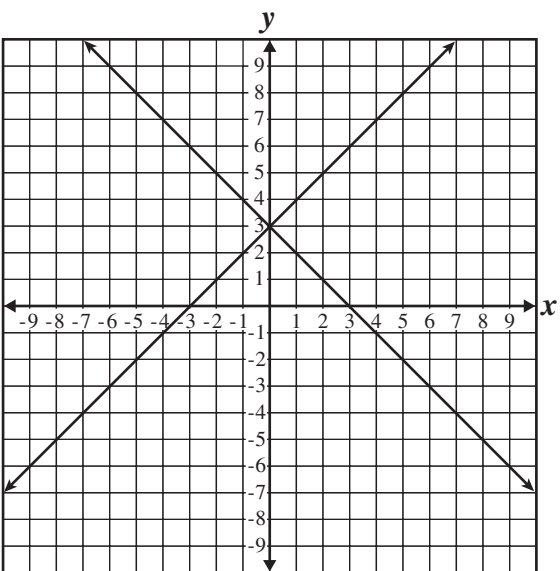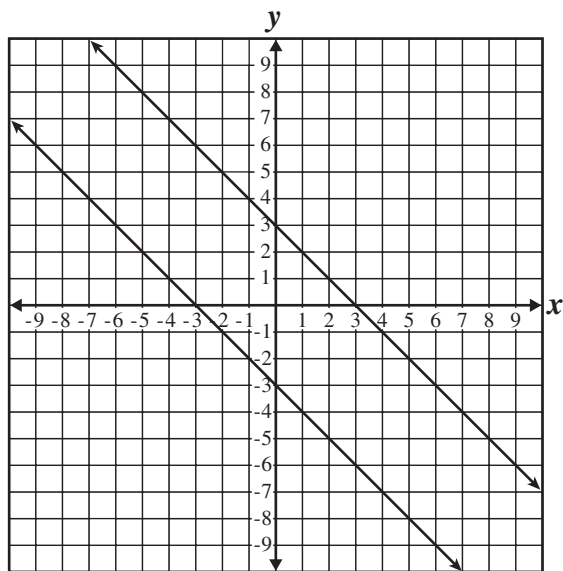
160. Simplify.

$$\left(x^2 - 3x + 1\right) - \left(x^2 + 2x + 7\right)$$
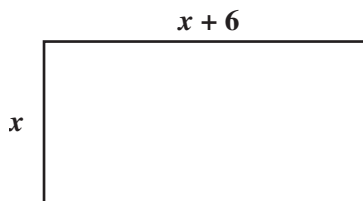
   A $x - 6$

   B $-x + 8$

   C $-5x - 6$

   D $2x^2 - x + 8$

163. Mr. Jacobs can correct 150 quizzes in 50 minutes. His student aide can correct 150 quizzes in 75 minutes. Working together, how many minutes will it take them to correct 150 quizzes?

   A   30

   B   60

   C   63

   D   125

$$x + 6$$

$$x$$

161. The length of the rectangle above is 6 units longer than the width. Which expression could be used to represent the area of the rectangle?

   A $x^2 + 6x$

   B $x^2 - 36$

   C $x^2 + 6x + 6$

   D $x^2 + 12x + 36$

164. Ricardo runs 10 miles each Saturday. If he doubles his usual speed, he can run the 10 miles in one hour less than his usual time. What is his usual speed?

   A   2 miles per hour

   B   3 miles per hour

   C   4 miles per hour

   D   5 miles per hour

162. Simplify.

$$\frac{4x^3 + 2x^2 - 8x}{2x}$$

   A $2x^2 + x - 4$

   B $4x^2 + 2x - 8$

   C $2x^2 + 2x^2 - 8x$

   D $8x^4 + 4x^3 - 16x^2$

Question Number	Correct Answer	Standard	School Year of Exam
135	D	1A2.0	2001-2002
136	C	1A2.0	2001-2002
137	D	1A2.0	2004-2005
138	C	1A3.0	2001-2002
139	A	1A3.0	2000-2001
140	B	1A3.0	2000-2001
141	A	1A4.0	2001-2002
142	B	1A4.0	2001-2002
143	B	1A4.0	2000-2001
144	C	1A4.0	2000-2001
145	A	1A5.0	2002-2003
146	D	1A5.0	2001-2002
147	A	1A6.0	2002-2003
148	D	1A6.0	2001-2002
149	A	1A6.0	2000-2001
150	D	1A6.0	2000-2001
151	A	1A7.0	2002-2003
152	A	1A7.0	2001-2002
153	C	1A8.0	2001-2002
154	B	1A8.0	2000-2001
155	B	1A8.0	2000-2001
156	A	1A8.0	2004-2005
157	B	1A9.0	2001-2002
158	C	1A9.0	2000-2001
159	B	1A9.0	2003-2004
160	C	1A10.0	2002-2003
161	A	1A10.0	2000-2001
162	A	1A10.0	2003-2004
163	A	1A15.0	2001-2002
164	D	1A15.0	2004-2005

Mathematics Released Test Questions

October 2005